

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平9-92949

(43) 公開日 平成9年(1997)4月4日

(51) Int.Cl. ⁶	識別記号	序内整理番号	F I	技術表示箇所
H 0 5 K 1/11		6921-4E	H 0 5 K 1/11	C
H 0 1 R 23/68		6901-5B	H 0 1 R 23/68	E
H 0 5 K 1/02			H 0 5 K 1/02	D
1/16			1/16	B

審査請求 未請求 請求項の数 2 O L (全 4 頁)

(21) 出願番号 特願平7-250680

(22) 出願日 平成7年(1995)9月28日

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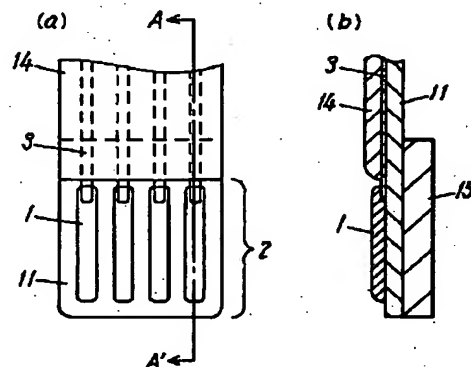
(54) 【発明の名称】 フレキシブル配線板

(57) 【要約】

【目的】 AV, OA機器等の電気配線用として使用されるフレキシブル配線板において、コネクタ挿抜耐久性と耐折性とを両立した優れたフレキシブル配線板を提供することを目的とする。

【構成】 フレキシブル配線板において、配線パターン3の端部に被膜硬度が鉛筆硬度4H~6Hのコンタクト部1を導通させて印刷形成することにより、電氣的に安定した接続を保証することができる。

- 1 被膜硬度が鉛筆硬度4H~6Hのコンタクト部
- 2 フレキシブル配線板の端部
- 3 配線パターン
- 11 絶縁フィルム
- 14 絶縁被膜
- 15 補強板



【特許請求の範囲】

【請求項1】 絶縁フィルム上に印刷形成した配線パターン1の端部に電氣的に導通して印刷形成された被膜硬度が鉛筆硬度4H~6Hのコンタクト部、およびその裏面に固着された補強板を有するフレキシブル配線板。

【請求項2】 コンタクト部を配線パターン1の端部に重ねて印刷形成した請求項1記載のフレキシブル配線板。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、AV、OA機器等の電気配線用として使用されるフレキシブル配線板に関するものである。

【0002】

【従来の技術】近年、AV、OA機器等は軽薄短小化の傾向にあり、プリント基板間等を電氣的に接続させる配線板として、セット内部の隙間を自由自在に折り曲げて配置することができるフレキシブル配線板の使用が増加してきている。

【0003】通常、フレキシブル配線板には耐折性を得るために被膜硬度が鉛筆硬度3H以下で8~20μ程度の厚さの配線パターンが引き回されており、そのフレキシブル配線板と他のプリント基板等の接続は、フレキシブル配線板の端部をプリント基板等に取り付けられたコネクタに差し込むことによって行われている。

【0004】以下に、従来のフレキシブル配線板の構成について、図6により説明する。図6(a)は従来のフレキシブル配線板の端部の平面図、(b)は同断面図であり、同図において、11は絶縁フィルム(例えばPETフィルムなど)で、この上に硬化後の被膜強度が鉛筆硬度3H以下になる銀ペーストで配線パターン12を印刷形成し、他のプリント基板等に取り付けられたコネクタに挿入する端部13以外の部分は絶縁被膜14にて覆うとともに、端部13の裏面に接着剤により補強板15を貼り付けて構成されていたものであり、コネクタ等の端子と接触することになるフレキシブル配線板のコンタクト部16は上記配線パターン12と同一材料にて印刷形成されていた。

【0005】

【発明が解決しようとする課題】しかしながら上記従来の構成では、コンタクト部16のコネクタに対する挿抜保証回数が一般的に20回程度要求されるものであり、鉛筆硬度3H以下の配線パターン12と同材料にて印刷形成したコンタクト部16ではコネクタに挿抜した場合、前記コンタクト部16に剥離・磨耗等が発生し、特に図7に示すフォーク端子17を有するノンジフタイプコネクタ18との挿抜においては、フォーク端子17のバネ接触圧をコンタクト部16に常に受けながら強制的に挿抜することになるため、コンタクト部16の剥離・磨耗等の度合いが大きく、20回というコネクタ挿抜保証回数に対し、安定した電氣的接続を保証することは難し

かった。

【0006】本発明はこのような従来の課題を解決するものであり、簡単な印刷構成のみでコネクタ挿抜保証回数後でも安定した電氣的接続を保証し得るコンタクト部を有するフレキシブル配線板を提供しようとするものである。

【0007】

【課題を解決するための手段】この課題を解決するために本発明のフレキシブル配線板は、絶縁フィルム上に印刷形成した配線パターン1の端部に被膜硬度が鉛筆硬度4H~6Hのコンタクト部を導通させて印刷形成する構成としたものである。

【0008】

【作用】この構成により配線パターン1の端部に被膜硬度が鉛筆硬度4H~6Hのコンタクト部を導通させて印刷形成した上をコネクタ端子が摺動することになるため、コンタクト部の剥離・磨耗等が減少し、コネクタ挿抜保証回数後でも安定した電氣的接続が得られるものである。

【0009】

【実施例】以下、本発明の一実施例を図面に基づいて説明する。

【0010】図1は同実施例のフレキシブル配線板を示すものであり、図1(a)はフレキシブル配線板の端部の平面図、図1(b)は同断面図である。

【0011】なお、本実施例において前述の従来例で説明した構成部分と同じ部分については同一の符号を付して説明を省略する。

【0012】図1(a)、(b)において、1は従来例と同様のフレキシブル配線板の端部2に銀ペーストで印刷形成された被膜硬度が鉛筆硬度4H~6Hのコンタクト部であり、配線パターン3の端部と電氣的に導通しているものである。

【0013】ここで、図2ならびに図3のグラフを使用して本実施例のコンタクト部1の鉛筆硬度(4H~6H)の設定について、試験結果を基に説明する。

【0014】まず、図2はコネクタ挿抜保証可能回数-被膜硬度の相関グラフであるが、被膜硬度を硬くしていく(鉛筆硬度を増す)と、安定した電氣的接続を保証できるコネクタ挿抜回数は増加する傾向があり、フレキシブル配線板として必要である挿抜保証回数は20回以上であることより、コンタクト部1の被膜硬度は鉛筆硬度4H以上が必要であることがわかる。

【0015】次に、図3は耐折性保証可能回数-被膜硬度の相関グラフであるが、フレキシブル配線板は、ノンジフタイプコネクタには強制的に押し込まれることになるため、挿入時に端部2が折れ曲がりコンタクト部1にクラックが発生し、電氣的接続が不安定になる場合があるため、コネクタ挿抜保証回数と同等の耐折性回数保証が必要となり、同図によりコンタクト部1は鉛筆硬度6

H以下でなくてはならないと言える。

【0016】以上の結果より総合的に判断すると、安定した電氣的接続を保証できるコネクタ挿抜寿命回数と耐折性回数を両立させるコンタクト部1の被膜硬度は、鉛筆硬度4H～6Hが最適ということが言える。

【0017】以上本発明の一実施例を説明したが、本発明は上記構成に限られるものではなく、例えば以下のような構成も可能である。

【0018】すなわち、第二実施例として図4に示すように、被膜硬度が鉛筆硬度4H～6Hのコンタクト部4の下全体に配線パターン5を形成しておく構成としてもよいし、第三実施例として図5に示すように、被膜硬度が鉛筆硬度4H～6Hであるコンタクト部6を先に印刷し、コンタクト部6の端部7に配線パターン8を重ね印刷した構成としたものでも第一実施例と同等の効果が得られることは言うまでもない。

【0019】更に、フレキシブル配線板の裏面に貼り付けている補強板15は、印刷により形成することでもでき、構成部品並びに製造工程の簡素化という効果も期待できるものである。

【0020】

【発明の効果】以上のように本発明のフレキシブル配線板は、配線パターンの端部に被膜硬度が鉛筆硬度4H～6Hのコンタクト部を導通させて印刷形成することにより、コネクタ挿抜耐久性と耐折性とを両立させ、電氣的に安定した接続を保証することができる優れたコンタクト部を有するフレキシブル配線板を提供できるものであ

る。

【図面の簡単な説明】

【図1】(a)本発明の第一実施例であるフレキシブル配線板の端部の平面図

(b)同図1(a)A-A'線における断面図

【図2】コネクタ挿抜保証可能回数－被膜硬度の相関グラフ

【図3】耐折性保証可能回数－被膜硬度の相関グラフ

【図4】(a)本発明の第二実施例であるフレキシブル配線板の端部の平面図

(b)同図4(a)A-A'線における断面図

【図5】(a)本発明の第三実施例であるフレキシブル配線板の端部の平面図

(b)同図5(a)A-A'線における断面図

【図6】(a)従来のフレキシブル配線板の端部の平面図

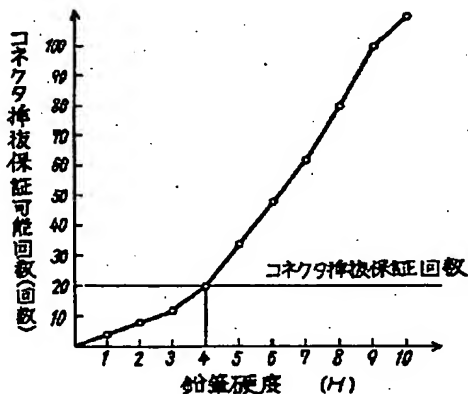
(b)同図6(a)A-A'線における断面図

【図7】同端部をノンジフタイプコネクタに挿入した状態の側断面図

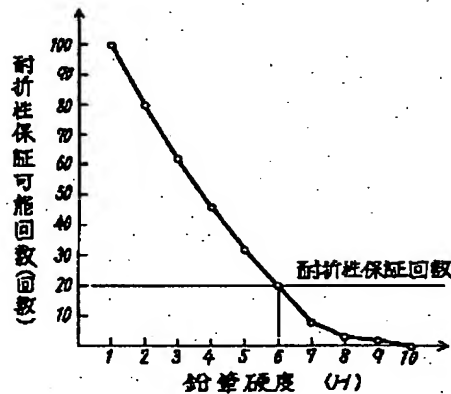
20 【符号の説明】

- 1 被膜硬度が鉛筆硬度4H～6Hのコンタクト部
- 2 フレキシブル配線板の端部
- 3 配線パターン
- 11 絶縁フィルム
- 14 絶縁被膜
- 15 補強板

【図2】

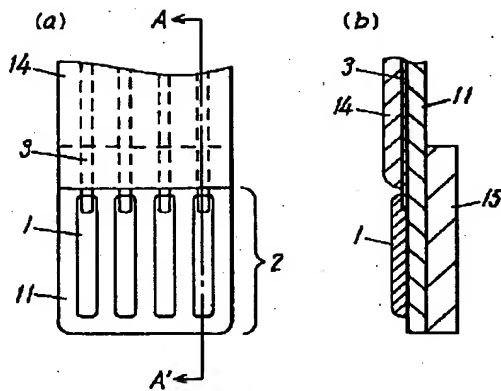


【図3】

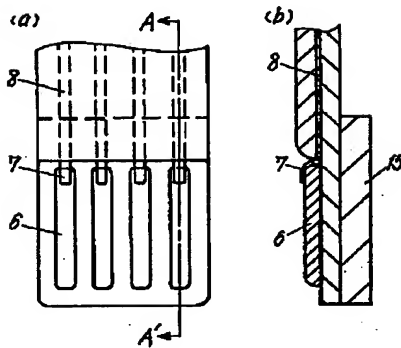


【図1】

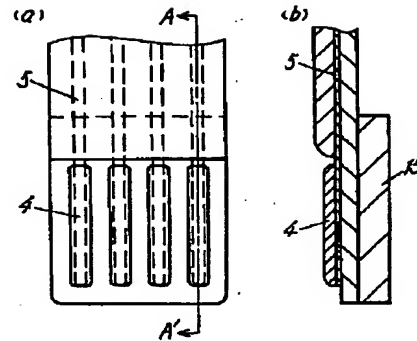
- 1 被膜硬度が鉛筆硬度4H~6Hの
コンタクト部
2 フレキシブル配線板の
端部
3 配線パターン
11 絶縁フィルム
14 絶縁被膜
15 補強板



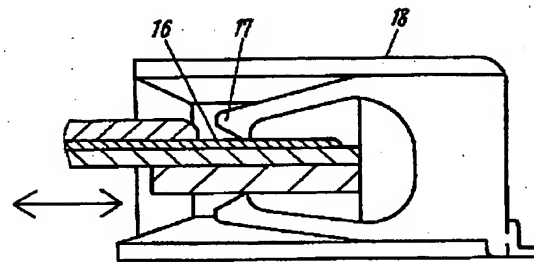
【図5】



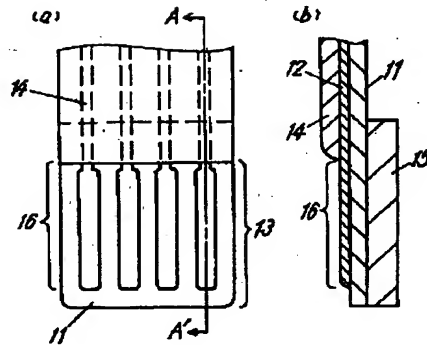
【図4】



【図7】



【図6】



フロントページの続き

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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-092949

(43)Date of publication of application : 04.04.1997

(51)Int.Cl.

H05K 1/11
H01R 23/68
H05K 1/02
H05K 1/16

(21)Application number : 07-250680

(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

(22)Date of filing : 28.09.1995

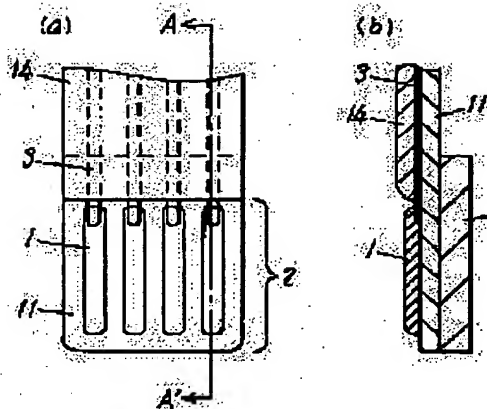
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(54) FLEXIBLE WIRING BOARD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an improved flexible wiring board having both of connector insertion and removal durability and break resistance for use in electric wiring in an AV, OA apparatus etc.

SOLUTION: In a flexible wiring board, a contact part 1, whose film hardness being pencil hardness 4H-6H, is printed and formed at the end of a wiring pattern 3 so that the contact part 1 can conduct current, thereby electrically stable connection can be ensured.



LEGAL STATUS

[Date of request for examination] 25.05.2001

[Date of sending the examiner's decision of rejection] 29.03.2005

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision
of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] The flexible patchboard which has the contact section whose coat degrees of hardness by which printing formation was carried out by flowing electrically at the edge of the circuit pattern which carried out printing formation on the insulating film are the pencil degrees of hardness 4H-6H, and the back up plate which fixed to the rear-face side.

[Claim 2] The flexible patchboard according to claim 1 which carried out printing formation of the contact section in piles at the edge of a circuit pattern.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the flexible patchboard used as objects for electric wiring, such as AV and OA equipment.

[0002]

[Description of the Prior Art] In recent years, AV, OA equipment, etc. are in the inclination of small-and-light-izing, and the activity of the flexible patchboard which can bend the clearance inside a set freely and can arrange it as a patchboard to which between printed circuit boards etc. is connected electrically has been increasing them.

[0003] Usually, in order to obtain folding endurance to a flexible patchboard, the circuit pattern with a thickness of about 8-20micro is taken about less than [pencil degree-of-hardness 3H], and the coat degree of hardness is performed by inserting connection of the flexible patchboard, other printed circuit boards, etc. in the connector in which the edge of a flexible patchboard was attached by the printed circuit board etc.

[0004] Below, drawing 6 explains the configuration of the conventional flexible patchboard. Drawing 6 (a) is the top view of the edge of the conventional flexible patchboard, (b) is this sectional view, and 11 is insulating films (for example, PET film etc.) in this drawing. Parts other than edge 13 inserted in the connector which carried out printing formation of the circuit pattern 12 with the silver paste with which the coat reinforcement after besides hardening becomes less than [pencil degree-of-hardness 3H], and was attached in other printed circuit boards etc. with the insulating coat 14 with a wrap The back up plate 15 is stuck on the rear face of an edge 13 with adhesives, it is constituted, and printing formation of the contact section 16 of a flexible patchboard which will contact terminals, such as a connector, was carried out with the same ingredient as the above-mentioned circuit pattern 12.

[0005]

[Problem(s) to be Solved by the Invention] However, it is what the count of an insert-and-remove guarantee to the connector of the contact section 16 is generally required as about 20 times with the above-mentioned conventional configuration. When insert and remove are carried out to a connector in the contact section 16 which carried out printing formation with the circuit pattern 12 and this ingredient not more than pencil degree-of-hardness 3H, In insert and remove with the NONJIFU type connector 18 which has the fork terminal 17 which exfoliation, wear, etc. generate in said contact section 16, and is shown especially in drawing 7 Since insert and remove would be carried out compulsorily, always receiving the spring contact pressure of the fork terminal 17 in the contact section 16, degrees, such as exfoliation, wear, etc. of the contact section 16, were large, and it was difficult to guarantee the electrical installation stabilized to the count of a connector insert-and-remove guarantee of 20 times.

[0006] This invention tends to solve such a conventional technical problem, and tends to offer the flexible patchboard which has the contact section which can guarantee the electrical installation stabilized also after the count of a connector insert-and-remove guarantee only with the easy printing configuration.

[0007]

[Means for Solving the Problem] In order to solve this technical problem, the flexible patchboard of this invention is considered as the configuration which the edge of the circuit pattern which carried out printing formation on the insulating film is made to flow through the contact section whose coat degrees of hardness are the pencil degrees of hardness 4H-6H, and carries out printing formation.

[0008]

[Function] In order that a connector terminal may slide after making the edge of a circuit pattern flow through the contact section whose coat degrees of hardness are the pencil degrees of hardness 4H-6H by this configuration and carrying out printing formation, exfoliation, wear, etc. of the contact section decrease, and the electrical installation stabilized also after the count of a connector insert-and-remove guarantee is obtained.

[0009]

[Example] Hereafter, one example of this invention is explained based on a drawing.

[0010] Drawing 1 shows the flexible patchboard of this example, drawing 1 (a) is the top view of the edge of a flexible patchboard, and drawing 1 (b) is this sectional view.

[0011] In addition, the sign same about the same part as the component explained in the above-mentioned conventional example in this example is attached, and explanation is

omitted.

[0012] In drawing 1 (a) and (b), the coat degree of hardness by which printing formation was carried out with a silver paste at the edge 2 of the same flexible patchboard as the conventional example is the contact section which are the pencil degrees of hardness 4H-6H, and has flowed through 1 on the edge and the electric target of a circuit pattern 3.

[0013] Here, setting out of the pencil degree of hardness (4H-6H) of the contact section 1 of this example is explained based on a test result using the graph of drawing 2 and drawing 3.

[0014] first -- although drawing 2 is the correlation graph of the count-coat degree of hardness which can be connector insert-and-remove guaranteed -- a coat degree of hardness -- hard -- carrying out (a pencil degree of hardness being increased) -- the count of connector insert and remove which can guarantee the stable electrical installation tends to increase, and the coat degree of hardness of the contact section 1 is understood that more than pencil degree of hardness 4H is required from the count of an insert-and-remove guarantee required as a flexible patchboard being 20 times or more.

[0015] Next, although drawing 3 is the correlation graph of the count-coat degree of hardness which can be folding endurance guaranteed Since a flexible patchboard will be compulsorily stuffed into a NONJIFU type connector, Since an edge 2 may bend at the time of insertion, a crack may occur in the contact section 1 and electrical installation may become instability, the count guarantee of folding endurance equivalent to the count of a connector insert-and-remove guarantee is needed, and the contact section 1 can be said to be indispensable less than [pencil degree of hardness 6H] with this drawing.

[0016] If it judges more synthetically than the above result, the coat degree of hardness of the contact section 1 which reconciles the count of a connector insert-and-remove life which can guarantee the stable electrical installation, and the count of folding endurance can say that the pencil degrees of hardness 4H-6H are the optimal.

[0017] Although one example of this invention was explained above, this invention is not restricted to the above-mentioned configuration, and the following configurations are also possible for it.

[0018] Namely, as are shown in drawing 4 as the second example, and it is good also as a configuration which forms the circuit pattern 5 in the whole bottom of the contact section 4 whose coat degrees of hardness are the pencil degrees of hardness 4H-6H and is shown in drawing 5 as the third example It cannot be overemphasized that the

effectiveness that what was considered as the configuration whose coat degree of hardness printed previously the contact section 6 which are the pencil degrees of hardness 4H-6H, and carried out the overprint of the circuit pattern 8 to the edge 7 of the contact section 6 is equivalent to the first example is acquired.

[0019] Furthermore, the back up plate 15 currently stuck on the rear face of a flexible patchboard can also be formed by printing, and can also expect the effectiveness of the simplification of a production process from a component part list.

[0020]

[Effect of the Invention] As mentioned above, by making the edge of a circuit pattern flow through the contact section whose coat degrees of hardness are the pencil degrees of hardness 4H-6H, and carrying out printing formation, the flexible patchboard of this invention reconciles connector insert-and-remove endurance and folding endurance, and can offer the flexible patchboard which has the outstanding contact section which can guarantee the connection stabilized electrically.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] (a) The top view of the edge of the flexible patchboard which is the first example of this invention

(b) The sectional view in a this drawing 1 (a) A-A' line

[Drawing 2] The correlation graph of the count-coat degree of hardness which can be connector insert-and-remove guaranteed

[Drawing 3] The correlation graph of the count-coat degree of hardness which can be folding endurance guaranteed

[Drawing 4] (a) The top view of the edge of the flexible patchboard which is the second example of this invention

(b) The sectional view in a this drawing 4 (a) A-A' line

[Drawing 5] (a) The top view of the edge of the flexible patchboard which is the third example of this invention

(b) The sectional view in a this drawing 5 (a) A-A' line

[Drawing 6] (a) The top view of the edge of the conventional flexible patchboard

(b) The sectional view in a this drawing 6 (a) A-A' line

[Drawing 7] The sectional side elevation in the condition of having inserted this edge in the NONJIFU type connector

[Description of Notations]

1 Contact Section whose Coat Degrees of Hardness are Pencil Degrees of Hardness 4H-6H

2 Edge of Flexible Patchboard

3 Circuit Pattern

11 Insulating Film

14 Insulating Coat

15 Back Up Plate

[Translation done.]